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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/664,277	09/17/2003	Nicolay Y. Kovarsky	AMAT/7735/CMP/ECP/RKK	3455

44257 7590 08/16/2005

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EXAMINER

BIRENBAUM, NIRA S

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 08/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/664,277

Applicant(s)

KOVARSKY ET AL.

Examiner

Nira S. Birenbaum, Ph.D.

Art Unit

1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 March 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 18-21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-21 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 1/2/05 and 3/17/05
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-17, drawn to an apparatus, classified in class 204, subclass 194.
- II. Claims 18-21, drawn to a method, classified in class 205, subclass 252.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the method as claimed in claim 18 can be practiced using an apparatus with electrodes which are not concentrically arranged, as claimed in claim 1.

During a telephone conversation with B. Todd Patterson on July 29, 2005 a provisional election was made with traverse to prosecute the invention of I, claims 1-17. Affirmation of this election must be made by applicant in replying to this Office action. Claims 18-21 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim

Art Unit: 1742

remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 5, and 9 are rejected under 35 U.S.C. 102(e) as being anticipated by Mayer *et al.* (US Patent No. 6,773,571).

Regarding claim 1, Mayer teaches an electrochemical plating cell comprising:

- a fluid basin (113) configured to contain a plating solution (115)
- an anode fluid volume in the lower portion of the basin (anode chamber 131) and a cathode fluid volume in the upper portion of the basin (the cathode is wafer 119), separated by a membrane (145). (See Figure 9. Note that this figure depicts a detailed view of the anode chamber 131 and that the chamber is held within the fluid basin as shown in Figure 4. Thus the electrolyte in the fluid basin between the cathode and the membrane, which is not shown, would comprise the cathode fluid volume.)

Art Unit: 1742

- an electrode centrally positioned in the anode chamber (**125** in Figure 4, also present in Figure 9)
- an auxiliary electrode positioned radially outward from the first electrode (**127** in Figure 4, also present in Figure 9).

Regarding claim 5, Mayer teaches an insulative spacer between the electrodes (element **129**, see column 10 lines 26-27).

Regarding claim 9, Mayer teaches an electrochemical plating cell comprising

- an anolyte compartment (anode chamber **131**)
- a catholyte compartment in ionic communication with the anolyte compartment via a membrane (**145**). (See Figure 9. Note that this figure depicts a detailed view of the anode chamber **131** and that the chamber is held within the fluid basin as shown in Figure 4. Thus the electrolyte in the fluid basin between the cathode and the membrane, which is not shown, would comprise the catholyte compartment.)
- an anode positioned in the anolyte compartment (**125** in Figure 4, also present in Figure 9)
- an auxiliary electrode positioned in the anolyte compartment (**127** in Figure 4, also present in Figure 9).

Claims 6, 7, 16 and 17 are rejected under 35 U.S.C. 102(e) as being unpatentable over Mayer *et al.* as evidenced by Wang (US Patent No. 6,248,222).

Mayer teaches an electroplating cell as described in claim 1 above.

Furthermore, Mayer teaches that the power supply (inherent in circuit **117**) is configured to individually address each electrode and provide a different amount of current to each

Art Unit: 1742

one (see column 3, lines 35-47; column 9 line 67 to column 10 line 2; and Figure 4).

Mayer does not expressly teach that one electrode is cathodically biased and the other is anodically biased. However, the ability to have this configuration is inherent to the apparatus of Mayer, because Mayer teaches that the electrodes are individually addressable (ie, a different current is applied to each one). The limitation of biasing the electrodes with a certain polarity is directed to a manner of operating the apparatus, and does not provide any structural limitation. Therefore, these limitations are not given patentable weight. See MPEP 2114.

Furthermore, it is well known in the art that the power supply of an electrochemical cell can be configured to apply either an anodic or cathodic voltage. This is evidenced by Wang, who describes an electrochemical apparatus (see Figures 1 and 2) which is similar to the apparatus of Mayer. Wang teaches that the electrodes of the apparatus can be biased either anodically or cathodically, depending on the desired application. Because Mayer teaches that a different current can be applied to each electrode in the apparatus, the claims 6, 7, 16 and 17, which are directed to the ability to bias the electrodes with different polarities, are unpatentable over Mayer.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-4, 8, 10-12 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mayer in view of Woodruff (US Patent No. 6,497,801).

Mayer teaches the features as previously described. Furthermore, Mayer teaches that the electrodes are made of high purity copper (column 10, lines 4-7). However, regarding claims 2, 3, 8 and 10, this reference does not teach that the electrodes are insoluble platinum coated electrodes.

Woodruff teaches an electroplating apparatus with multiple concentric anodes. The anodes are composed of titanium with a platinum coating (column 6, lines 3-5). It would have been obvious to one of ordinary skill in the art at time of the invention to modify the plating cell of Mayer by replacing one or both of the copper anodes with insoluble platinum-coated anodes as taught by Woodruff, in order to avoid the expense of replacing the consumable copper anodes as taught by Woodruff (column 5, line 66 to column 6, line 5).

Regarding claim 4, Mayer teaches that the auxiliary electrode is positioned to circumscribe the central inert anode and that they are in substantially the same plane (see Figure 5).

Regarding claim 11, Mayer and Woodruff teach the features as described above for claims 9 and 10. Furthermore, Mayer teaches an electroplating cell wherein the central anode is a disk-shaped member with a substantially planar upper surface and the auxiliary electrode is an annular member with a substantially planar upper surface (see Figure 4).

However, Mayer does not teach the disk shaped anode in the same embodiment as the divided cell described above in reference to claim 9 (this is the embodiment corresponding to Figure 9 of Mayer, which shows an annular central anode). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the disk-shaped electrode of Mayer's Figure 4 in the divided cell of Mayer's Figure 9, in order to increase the surface area of the electrode.

Regarding claim 12, Mayer teaches that the annular auxiliary electrode circumscribes the disk-shaped electrode (see Figures 4 and 5).

Regarding claim 15, Mayer teaches an insulative spacer positioned between the disk shaped electrode and the annular electrode (element 129, see column 10 lines 26-27).

Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mayer in view of Woodruff as applied to claim 12 above, and further in view of Lichtenberger *et al.* (US Patent No. 4,786,390).

Mayer and Woodruff teach the features as previously described. However, these references do not teach that the inner diameter of the annular electrode and the outer diameter of the disk-shaped electrode should be larger than the diameter of the substrate.

Lichtenberger teaches that the size of an anode in an electroplating cell affects the current density (column 7, lines 39-44). It would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the size of the electrodes

Art Unit: 1742

relative to the substrate, because Lichtenberger teaches that this is a result-effective variable. See MPEP 2144.05 IIB.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nira S. Birenbaum, Ph.D. whose telephone number is (571) 272-8516. The examiner can normally be reached on M-F 8:00 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

nsb

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